

First query:

```
BGP(<http://example.org/Sun>
    <http://example.org/satellite> ?satellite.)
```

satellite
ex:Mercury
ex:Venus
ex:Earth
ex:Mars

```
BGP(?satellite <http://example.org/satellite> ?object.)
```

satellite	object
ex:Sun	ex:Mercury
ex:Sun	ex:Venus
ex:Sun	ex:Earth
ex:Sun	ex:Mars
ex:Earth	ex:Moon
ex:Mars	ex:Phobos
ex:Mars	ex:Deimos

```
Join(BGP(<http://example.org/Sun>
        <http://example.org/satellite> ?satellite.),
    BGP(?satellite <http://example.org/satellite> ?object.)
)
```

satellite	object
ex:Earth	ex:Moon
ex:Mars	ex:Phobos
ex:Mars	ex:Deimos

```
BGP(<http://example.org/Sun>
    <http://example.org/satellite> ?object.)
```

object
ex:Mercury
ex:Venus
ex:Earth
ex:Mars

```
Union(BGP(<http://example.org/Sun>
        <http://example.org/satellite> ?object.),
    Join(BGP(<http://example.org/Sun>
            <http://example.org/satellite> ?satellite.),
        BGP(?satellite <http://example.org/satellite> ?object.)
    )
)
```

object
ex:Mercury
ex:Venus
ex:Earth
ex:Mars

satellite	object
ex:Earth	ex:Moon
ex:Mars	ex:Phobos
ex:Mars	ex:Deimos

Second query:

BGP(?object <http://example.org/radius> ?radius.)

object	radius
ex:Sun	"1.392e6"^^xsd:double
ex:Mercury	"2439.7"^^xsd:double
ex:Venus	"6051.9"^^xsd:double
ex:Earth	"6372.8"^^xsd:double
ex:Mars	"3402.5"^^xsd:double
ex:Moon	"1737.1"^^xsd:double

BGP(?center <http://example.org/satellite> ?object.)

center	object
ex:Sun	ex:Mercury
ex:Sun	ex:Venus
ex:Sun	ex:Earth
ex:Sun	ex:Mars
ex:Earth	ex:Moon
ex:Mars	ex:Phobos
ex:Mars	ex:Deimos

LeftJoin(BGP(?object <http://example.org/radius> ?radius.),
 BGP(?center <http://example.org/satellite> ?object.),
 true
)

object	radius	center
ex:Sun	"1.392e6"^^xsd:double	
ex:Mercury	"2439.7"^^xsd:double	ex:Sun
ex:Venus	"6051.9"^^xsd:double	ex:Sun
ex:Earth	"6372.8"^^xsd:double	ex:Sun
ex:Mars	"3402.5"^^xsd:double	ex:Sun
ex:Moon	"1737.1"^^xsd:double	ex:Earth

Filter((4/3 * 3.1416 * ?radius * ?radius * ?radius > 20000000000),
 LeftJoin(BGP(?object <http://example.org/radius> ?radius.),
 BGP(?center <http://example.org/satellite> ?object.),
 true
)
)

object	radius	center
ex:Sun	"1.392e6"^^xsd:double	
ex:Mercury	"2439.7"^^xsd:double	ex:Sun
ex:Venus	"6051.9"^^xsd:double	ex:Sun
ex:Earth	"6372.8"^^xsd:double	ex:Sun
ex:Mars	"3402.5"^^xsd:double	ex:Sun
ex:Moon	"1737.1"^^xsd:double	ex:Earth

Third query – we omit the tables for the BGP expressions:

```
Join(BGP(?object <http://example.org/satellite> ?satellite.),
      BGP(?satellite <http://example.org/name> ?name.)
)
```

object	satellite	name
ex:Earth	ex:Moon	"Moon@en"
ex:Mars	ex:Phobos	"Phobos"
ex:Mars	ex:Deimos	"Deimos"

```
Join(Join(BGP(?object <http://example.org/satellite> ?satellite.),
          BGP(?satellite <http://example.org/name> ?name.)
),
      BGP(?center <http://example.org/satellite> ?object.)
)
```

center	object	satellite	name
ex:Sun	ex:Earth	ex:Moon	"Moon@en"
ex:Sun	ex:Mars	ex:Phobos	"Phobos"
ex:Sun	ex:Mars	ex:Deimos	"Deimos"

```
Join(Join(Join(BGP(?object <http://example.org/satellite>
?satellite.),
              BGP(?satellite <http://example.org/name> ?name.)
),
      BGP(?center <http://example.org/satellite> ?object.)
),
      BGP(?center <http://example.org/radius> ?radius>)
)
```

center	radius	object	satellite	name
ex:Sun	"1.392e6"^^xsd:double	ex:Earth	ex:Moon	"Moon@en"
ex:Sun	"1.392e6"^^xsd:double	ex:Mars	ex:Phobos	"Phobos"
ex:Sun	"1.392e6"^^xsd:double	ex:Mars	ex:Deimos	"Deimos"

```
Filter(((langMATCHES( LANG(?name), "en")) && (2 * ?radius > 3000)),
      Join(Join(Join(BGP(?object
                        <http://example.org/satellite> ?satellite.),
                      BGP(?satellite
                        <http://example.org/name> ?name.)
),
            BGP(?center <http://example.org/satellite> ?object.)
),
          BGP(?center <http://example.org/radius> ?radius>)
)
)
```

center	radius	object	satellite	name
ex:Sun	"1.392e6"^^xsd:double	ex:Earth	ex:Moon	"Moon@en"

Fourth query – we omit the tables for the BGP expressions:

```
Join(BGP(?object <http://example.org/satellite> ?satellite1.),
      BGP(?object <http://example.org/satellite> ?satellite2.)
)
```

object	satellite1	satellite2
ex:Sun	ex:Mercury	ex:Mercury
ex:Sun	ex:Mercury	ex:Venus
ex:Sun	ex:Mercury	ex:Earth
ex:Sun	ex:Mercury	ex:Mars
ex:Sun	ex:Venus	ex:Mercury
ex:Sun	ex:Venus	ex:Venus
ex:Sun	ex:Venus	ex:Earth
ex:Sun	ex:Venus	ex:Mars
ex:Sun	ex:Earth	ex:Mercury
ex:Sun	ex:Earth	ex:Venus
ex:Sun	ex:Earth	ex:Earth
ex:Sun	ex:Earth	ex:Mars
ex:Sun	ex:Mars	ex:Mercury
ex:Sun	ex:Mars	ex:Venus
ex:Sun	ex:Mars	ex:Earth
ex:Sun	ex:Mars	ex:Mars
ex:Earth	ex:Moon	ex:Moon
ex:Mars	ex:Phobos	ex:Phobos
ex:Mars	ex:Phobos	ex:Deimos
ex:Mars	ex:Deimos	ex:Phobos
ex:Mars	ex:Deimos	ex:Deimos

```
Filter((!sameTERM(?satellite1,?satellite2)),
      Join(BGP(?object <http://example.org/satellite> ?satellite1.),
            BGP(?object <http://example.org/satellite> ?satellite2.)
      )
)
```

object	satellite1	satellite2
ex:Sun	ex:Mercury	ex:Venus
ex:Sun	ex:Mercury	ex:Earth
ex:Sun	ex:Mercury	ex:Mars
ex:Sun	ex:Venus	ex:Mercury
ex:Sun	ex:Venus	ex:Earth
ex:Sun	ex:Venus	ex:Mars
ex:Sun	ex:Earth	ex:Mercury
ex:Sun	ex:Earth	ex:Venus
ex:Sun	ex:Earth	ex:Mars
ex:Sun	ex:Mars	ex:Mercury
ex:Sun	ex:Mars	ex:Venus
ex:Sun	ex:Mars	ex:Earth
ex:Mars	ex:Phobos	ex:Deimos
ex:Mars	ex:Deimos	ex:Phobos